

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

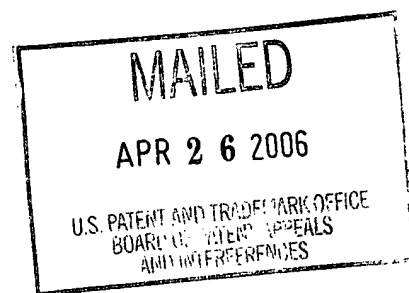
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN CHARLES CLARK
and JOSEPH WILLIAM FRISK

Appeal No. 2006-0816
Application 09/997,081

ON BRIEF



Before PAK, WARREN and WALTZ, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

Decision on Appeal

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1 through 11. Claims 12 through 14 are also of record and have been withdrawn from consideration by the examiner under 37 CFR § 1.142(b).

Claim 1 illustrates appellants' invention of a method of making a hydrophilic carbon fiber construction, and is representative of the claims on appeal:

1. A method of making a hydrophilic carbon fiber construction comprising the steps of:
 - a) immersing a carbon fiber construction in an aqueous dispersion of a metal oxide selected from Type I or Type II, wherein Type I consists of metal oxides having a negative zeta potential and Type II consists of metal oxides having a positive zeta potential;
 - b) contacting said dispersion with a counterelectrode; and
 - c) electrophoretically depositing said metal oxide on said carbon fiber construction by applying electric current between said carbon fiber construction and said counterelectrode;

wherein, when said metal oxide is selected from Type I said carbon fiber construction is the anode and when said metal oxide is selected from Type II said carbon fiber construction is the cathode.

The references relied on by the examiner are:

Illston et al. (Illston)	5,554,271	Sep. 10, 1996
Bett et al. (Bett)	5,840,414	Nov. 24, 1998

A.R. Boccaccini et al. (Boccaccini), "Use of electrophoretic deposition in the processing of fibre reinforced ceramic and glass matrix composites; a review," 32 *Composites Part A: Applied Sciences and Manufacturing* 997-1006 (Elsevier Science Publishers, B.V. Amsterdam, NL. 2001).

The examiner has rejected appealed claims 1 through 11 under 35 U.S.C. § 103(a) as being unpatentable over Boccaccini in view of Bett (answer, pages 4-6), and over Illston in view of Bett (answer, pages 6-7).

Appellants argue claims 1 through 11 as a group and further present additional separate argument with respect to claims 6 through 8, 10 and 11 as to both grounds of rejection (see brief in entirety; reply brief, page 2). Thus, we decide this appeal based on appealed claims 1, 6 through 8, 10 and 11 as representative of the grounds of rejection and appellants' groupings of claims. 37 CFR § 41.37(c)(1)(vii) (September 2004).

We affirm the first ground of rejection with respect to claims 1 through 5 and 9 through 11, and reverse this ground of rejection with respect to claims 6 through 8. We reverse the second ground of rejection with respect to all claims.

Accordingly, the decision of the examiner is affirmed-in-part.

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the answer and to the brief and reply brief for a complete exposition thereof.

Opinion

The threshold issue in this appeal entails the interpretation of the term "a carbon fiber construction" in appealed claim 1. We interpret the language of the claims by giving the terms thereof the broadest reasonable interpretation in their ordinary usage in context as they would be understood by one of ordinary skill in the art in light of the written description in the specification unless another meaning is intended by appellants as established in the written description of the specification, and without reading into the claims any limitation or particular

embodiment disclosed in the specification. *See, e.g., In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004); *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989).

Appellants disclose in the written description in the specification that “[a]ny suitable carbon fiber construction may be used,” which “[t]ypically” includes “woven and non-woven carbon fiber constructions” and “may include” illustrative commercial carbon paper, cloth and non-woven cloth (page 4, ll. 24-28). Among the illustrative commercial carbon paper is “Toray™ Carbon Paper,” such as “Toray™ Carbon Paper 060” (*id.*, page 4, l. 27, and page 7, l. 2), which, as the examiner points out (answer, page 8), includes untreated or “Teflon™ pretreated,” and appellants do not dispute the examiner’s finding (reply brief, in entirety). The examiner further relies on the disclosure in Boccaccini of methods for the electrophoretic deposition of metallic oxides on “Ni-coated carbon fibers . . . in the form of continuous tows of Ni-coated single carbon fibers” (Boccaccini, page 1002; answer, page 8), taking the position that “the fibers fit the disclosure of the [claimed] carbon fiber construction” in the specification (Boccaccini, page 1002; answer, pages 4 and 8). Appellants respond that the “nickel-coated carbon fibers . . . are not a carbon fiber construction, such as, e.g., a cloth or non-woven construction” and “[t]o the contrary, Boccaccini discloses that the fibers were in the form of ‘continuous tows,’” arguing that “[i]n contrast, the present invention concerns a hydrophilic carbon fiber construction that may be useful as a fuel cell gas diffusion layer” (reply brief, pages 2-3). We find that the term “tow” would have had the common, dictionary meaning in context to one of ordinary skill in this art of “[a] large number of continuous filaments collected in ropelike form without a definite twist.”¹

The examiner takes the same position with respect to the carbon coated ceramic fibers of Illston (answer, page 8), which appellants dispute on the basis that Illston would not have taught “a carbon fiber construction” (brief, page 6; reply brief, page 4). We find that Illston would not have disclosed to one of ordinary skill in the art any fiber having a carbon fiber core (Illston, e.g.,

¹ *See generally, McGraw-Hill Dictionary of Scientific and Technical Terms* 2048 (5th ed., Sybil P. Parker, ed., New York, McGraw-Hill, Inc. 1994).

col. 2, ll. 20-26).

On this record, we determine that the claimed method reads on the preparation of any manner of “a hydrophilic carbon fiber construction” comprising at least the step, among others, of “immersing” any manner of “a carbon fiber construction.” We determine that in light of the specification, the term “construction” means the carbon fibers are formed into any manner of structure, which includes woven and non-woven cloth, paper and tows. Indeed, we find no basis in the claim language or in the written description in the specification on which to read into the claims the limitation that the term “construction” is limited to woven or non-woven construction, and in fact, a tow is a “construction.” We further find no basis in the claim language or in the written description in the specification to read into the claims any limitation on the term “construction” based on any intended use disclosed in the specification for “a hydrophilic carbon fiber construction” as appellants argue. We further determine that “a carbon fiber” must have a carbon fiber core, and that, on this record, the carbon fiber core can be coated with any manner of coating which does not preclude the claimed method from depositing any amount, however small, of either or both types of zeta potential metal oxides such that the resulting carbon fiber construction would be hydrophilic to any extent. Indeed, appellants do not contend that the subject claim language reads on “a carbon fiber” *per se*, and we find no basis in the written description in the specification which precludes the broadest reasonable interpretation in context of this language that we have stated above.

Accordingly, in view of our finding above that Illston would not have disclosed a carbon core fiber construction, which construction is required by the subject claim language as we have interpreted it above, we find that the examiner has not established a *prima facie* case of obviousness of the claimed invention encompassed by the appealed claims over the combined teachings of Illston and Bett, and therefore, we reverse this ground of rejection.

Considering now the ground of rejection of the appealed claims over the combined teachings of Boccaccini and Bett, appellants submit, with respect to all appealed claims, only that “the product [of the claimed process] must be suitable for use as a fuel cell gas diffusion layer” (brief, page 5), and that the “continuous tows” of Ni-coated carbon fibers used in the Boccaccini process does not meet that requirement (reply brief, pages 2-3). We have addressed these issues

in determining that the claim language “a carbon fiber construction” does not exclude the fibers taught by Boccaccini.

Accordingly, on this record, we affirm the ground of rejection of claims 1 through 5 and 9 over this combination of references on this basis.

Turning now to dependent claims 6 through 8, we interpret these claims to require that the metal oxide used in the process of claim 1 is ZrO_2 , that is, zirconia, in claim 6 and that the carbon fiber construction is woven in claim 7 and non-woven in claim 8. Appellants point out that the process of Boccaccini relied on by the examiner does not employ zirconia and employs “continuous tows.” With respect to claim 6, the examiner points to the “overview of the published work dealing with the application of electrophoretic deposition for the fabrication of the fiber reinforced composites” in Boccaccini Table 1, stating that the penultimate article, that is, “[29],” summarized at the bottom of page 999 discloses “a system of carbon fiber and fiber cloth with a matrix alumina, zirconia and lead zirconate titanate” (answer, page 9). With respect to claim 8, the examiner finds that the references so summarized would have suggested that “the substitution of one type of carbon fiber for another would have been within the skilled of ordinary skill in the art as they are both fibers and conductive,” pointing to the disclosure of “carbon fibers and felts” (answer, pages 9-10; see also page 6). The examiner further contends with respect to claim 7, that Boccaccini would have disclosed “that electrophoretic deposition is a novel, simple and inexpensive method for achieving complete infiltration of tightly woven fiber performs (abstract and paragraph crossing pages 997 and 998)” (answer, page 9). Appellants submit that the overview of the articles provided in Boccaccini Table 1 “is not in itself enabling” and that there is no teaching of a non-woven construction in the articles summarized by Boccaccini (reply brief, page 3).

We find that Boccaccini would have disclosed to one of ordinary skill in this art that “Table 1 presents an overview of the published work dealing with the application of the EPD technique for the fabrication of fibre reinforced ceramic and glass matrix composites” wherein “[t]he feasibility of infiltrating ceramic woven fibre performs by EPD has been demonstrated for a variety of single and mixed component ceramic sols, as summarized in Table 1,” including “[m]ainly graphite [22,27-32] . . . woven fibrous mats” (page 998, right col.). We find it

impossible to determine from the “System: fabric/matrix” whether the EPD method described in each or all of references 22 and 27 through 32 would in fact enable the claimed method as encompassed by each of appealed claims 6 through 8. Thus, we agree with appellants that the summaries provided by Boccaccini in combination with the other teachings of this references and of Bett would not have enabled one of ordinary skill in this art to arrive at the claimed method encompassed by each of claims 6 through 8. *See generally, In re Payne*, 606 F.2d 303, 314, 203 USPQ 245, 255 (CCPA 1979) (a reference relied upon under § 103 must provide an enabling disclosure, placing the claimed invention in the possession of the public). Indeed, there is no substitute for the best evidence, which in this case, is the actual references summarized by Boccaccini.

Accordingly, we find that the examiner has not established a *prima facie* case of obviousness of the claimed invention encompassed by appealed claims 6 through 8 over the combined teachings of Boccaccini and Bett, and therefore, we reverse this ground of rejection as to these claims.

With respect to appealed claims 10 and 11, wherein the hydrophilicity of the hydrophilic carbon fiber constructions prepared by the method of appealed claim 1 is specified in terms of the mg of water wicked per 40mg of the hydrophilic carbon fiber construction, we agree with the examiner that, on this record, the combined teachings of Boccaccini and Bett would have suggested to one of ordinary skill in the art that the carbon fiber construction prepared with Ni-coated carbon fibers according to the teachings of Boccaccini would have been hydrophilic (answer, page 10), and would have adjusted the hydrophilicity as desired. *In re Aller*, 220 F.2d 454, 456-58, 105 USPQ 233, 235-37 (CCPA 1955) (“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”). Appellants merely submit that the references do not teach or suggest the claimed hydrophilicity (brief, pages 5-6; reply brief, pages 3-4).

Accordingly, on this record, we affirm the ground of rejection of claims 10 and 11 over this combination of references.

The examiner’s decision is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2005).

AFFIRMED-IN-PART



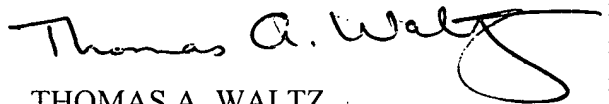
CHUNG K. PAK

Administrative Patent Judge



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